

In-situ Spectroscopic Analysis for Liquid CO₂ Replacement in Pure and Mixed CH₄ Hydrates System

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The sI pure methane and sII (methane+ ethane) mixed hydrates were contacted with liquid carbon dioxide. Using in-situ Raman spectroscopy, the reacting processes were observed. In sI pure methane hydrate system, methane molecule was replaced with carbon dioxide slowly, and after scores of hours, methane and carbon dioxide concentration in hydrate lattice were saturated. On the other hand, in sII (methane+ ethane) mixed hydrate system, methane and ethane molecules were replaced with carbon dioxide fast and almost of them were removed in hydrate lattice during structure of hydrate was changed into sI hydrate.